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R&D Focus Is on Industry as Bush Takes Office

The established patterns for managing research in America, little changed since the creation of NASA 30 years ago, have now aged to a point that many influential calls are being sounded for adopting new organizational forms. The designated problem areas range from salary limits and working conditions at the National Institutes of Health (see P. 5) to the linkages of academic, industrial, and government research for high-tech competition with Japan. The most fundamental new factor is that scientific-political attention, long focused on nurturing basic research, is shifting to the promotion of technology and the economics of longterm industrial research.

The calls for change coincide with the terminal days of the Reagan Administration, which means that nothing substantial can happen in this area until the Bush appointees have settled into office. It may appear that particular importance belongs to Bush's selection for Presidential Science Adviser, still unnamed as of this writing, and the place that the science-advisory apparatus will occupy in White House affairs. Possibly. But the new pressures for policy shifts in research and development affairs come as much from politics as from science, and changes are coming without the direct involvement of the established science-advisory system.

Thus, the last Congress, on its own initiative, transformed the ancient National Bureau of Standards into the National Institute of Standards and Technology (NIST), and gave it substantial new responsibilities, though little money, since there's not much loose change these days in Washington, to adopt new approaches to helping industry. At year end, NIST announced the establishment of three university-affiliated "regional manufacturing centers" to assist small and medium-size companies. To be organized by Rensselaer Polytechnic Institute, the University of South Carolina, and the Cuyahoga Community College (in Cleveland), the centers are eligible for at least $1.5 million each in NIST funds to match local support. The start is indeed very small, but, as far as Congress is concerned, American industry has sunk too far for government to tolerate the old lullabies about technological advances and commercial exploitation working out for the best if only left to their natural ways.

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New Twist in Baltimore Case: P. 5

During the election campaign, Bush's statements on science advice fulfilled the hopes of the scientific elders who have been earnestly pleading for a place of importance for science in Presidential decisionmaking. However, as the transition period draws to a close, they have become increasingly anxious for the announcement of a choice for Science Adviser. With the characteristic hubris of the Washington science elite, they have urged that the Presidential Science Adviser be named early in the appointment process to provide wise counsel on the selection of the scientific and technical sub-chieftains throughout the government.

Bush, however, has filled all cabinet posts but Energy and quite a few secondary positions throughout the government without the guidance of an officially designated scientific counselor. It's possible that he's getting advice from his choice for White House Chief of Staff, John Sununu, a PhD in mechanical engineering from MIT. But there's no public evidence of that, and it does not seem likely that Sununu is providing personnel screening for the cabinet departments.

When the new Administration is ready for innovations in science policy, it will find many readymade packages of diagnoses and remedies concerning the American way of doing research and development.

One of the most recent is an odd production released in the

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In Brief

The text of the last Reagan budget teems with self-congratulation on the growth in federal R&D spending, from $36 billion in 1982 to $67 billion proposed for next year, with non-government funding rising at about the same level. But the budget's hidden message is that the fiscal brakes are being applied to R&D, after years of substantial "real" growth. For calendar 1989, it states, national spending for R&D will amount to "a real increase of about one percent over 1988."

The political reality of the budget document, delivered 11 days before Bush takes office, is that Congress is going to take it apart and reassemble it to its liking, which tends toward less defense and more industrial rejuvenation these days. After hogging budget growth through most of the 1980s, Defense R&D stands no chance of getting the $2.6 billion increase---for a total of $41.5 billion---sought by Reagan.

Along with that big boost for the Pentagon, the outgoing Administration calls for trimming civilian energy research programs at DOE, elimination of the Sea Grant Program, and level funding for research at the Department of Agriculture.

The budget states that universities have fared well in federal support for basic research---up by a real 56 percent between 1982 and what's proposed for next year. Under the final Reagan budget, R&D of all kinds in academe would rise next year by 4 percent to a total of $8.7 billion.

One of the fastest-growing R&D entries is the politically trendy multi-agency program on global change, with $133 million this year, and $190 million proposed in the new budget.

...Defense Urged to Take Major Industrial Role

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twilight hours of the Reagan White House Science office, under the title *High Temperature Superconductivity: Perseverance and Cooperation on the Road to Commercialization* (43 pp., no charge; order from: Office of Science and Technology Policy, Old Executive Office Building, Washington, DC 20506; tel. 202/395-7347). This one came out of the White House Science Council (which advises the President's Science Adviser), and was produced by a panel chaired by Ralph Gomory, a soon-to-retire IBM Vice President who is sometimes mentioned as a possibility for Presidential Science Adviser, though he has been appointed President of the Sloan Foundation, effective next May.

The report states that the American research effort in superconductivity suffers from institutional fragmentation, lack of staying power, and too little proximity to potential industrial users. Solution: creation of four to six examples of a new breed of research establishment similar to, but not exactly like, the National Science Foundation's Science and Technology centers. The newcomers, "Superconductivity Consortia," with "the goal of basic research and of precompetitive research and development," would bring together academic, industrial, and government laboratories for longterm projects.

Unlike NSF, which usually limits its centers to five years of startup support, the Superconductivity Consortia would be committed "for the long haul," as much as a decade or two, the Gomory report says. And it pointedly adds that the new groups "should most likely not be funded by the NSF, and their funding should not compete with that of individual investigators."

The suggested exclusion of NSF is a major departure from the traditional ideology of federal support for basic research, which holds that nothing is forever in grantland. Though the panelists didn't say why, it may be assumed that they didn't see any possible matchup between their design for 10-20-year research programs and NSF's veneration of cutthroat competition for grants along with a policy of caps on duration of support for centers. NSF now runs a slew of centers, for about $350 million a year of its $2 billion budget. But, under fire from its traditional clientele of solo and small-group researchers, the Foundation regularly proclaims that the centers must earn their keep with scientific productivity, or they will be cut off, as two of the original Engineering Centers were last year.

The most far-reaching proposal for revamping the power structure of American science and technology is contained in a report issued last fall by the Defense Science Board (DSB), the Pentagon's senior science-advisory body, The *Defense Industrial and Technology Base* (60 pp., no charge; order from: Office of Assistant Secretary of Defense, PA, Room 2E-777, Pentagon, Washington, DC 20301-1400; tel. 202/697-5737.)

Produced by a committee chaired by Robert A. Fuhrman, President of Lockheed Corp., the report, in effect, nominates the Pentagon for a new role: Ministry of Technology of the USA. The Defense Department must take on that job, the DSB asserts, because industry and the government's civilian research agencies are demonstrably incapable of sustaining the technological base necessary for defense, and the Pentagon, the report implies, is the only institution that can do it.

Expressing approval of earlier calls by Defense Department officials for beefing up the industrial base, the DSB report states the Pentagon must accept "a new and unfamiliar role" in the national economy. "DOD," it states, "must strongly voice its concerns in the councils of the Executive and Legislative Branches on matters of national and international economic policies which affect the industrial base. This role is not one usually assigned to DOD; but DOD cannot meet its mission without a strong commercial base and it should recognize and accept this broader responsibility."

The report goes on to propose that the Pentagon extend its scope beyond industry to the national educational enterprise, which it labels another failure in promoting national strength. "The improvement of the quality of the nation's educational system is necessary to assure future competitiveness of U.S. manufacturing industry," the report states. "For this issue to be resolved, however, DOD will have to devote a substantial amount of resources and enlist the assistance of many others in government.

"While DOD does and should direct its own educational resources to assist in this area," the report continues, "the larger issue relates to university and secondary school involvement. DOD should exploit its potential as a catalyst to encourage appropriate government agencies and industry to address this issue. DOD can provide the leadership and guidance to assist in a national coalition between government and industry to achieve the educational goals necessary for national success."

This imperialist blueprint for the Pentagon might ordinarily be dismissed as nonsense, but to an extent not widely realized, DOD has long been concerned with many tasks besides running the Army, Navy, and Air Force. In national

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Graham Goes Out on Sweet and Sour Notes

With recriminations about Congressional budget bashing of his office and warnings of the dangers of scientific "tsardom," White House Science Adviser William R. Graham put on a lugubrious swansong last week in his final press briefing on the Reagan R&D budget.

Asked whether he might continue as Director of the Office of Science and Technology Policy (OSTP) in the Bush Administration, Graham replied, "I don't wish to be a candidate for *this* particular office." He didn't specify another.

Graham, who has held the job since October 1986, spoke approvingly of the growth of basic research during the Reagan Administration---up by a "real" 56 percent between 1982 and the proposed spending for 1990, he said. And he cited a number of the Administration's high-tech and big-science initiatives, including the space station, SDI, the hypersonic aircraft, AIDS research, the human genome project, and the Superconducting Super Collider (SSC).

Regarding Congressional treatment of his office, Graham noted that at hearings last year before the House Science, Space, and Technology Committee, "Virtually all Members and witnesses agreed that OSTP should be expanded and given the resources needed to meet its Congressionally mandated charter. Yet," he continued, "Congress actually cut the appropriations for OSTP in 1989 to the lowest level in real terms since it began, a level only half of that in 1984."

What he left out was that the hearings were inspired by reports of his inept management of OSTP, and the budget cuts were inspired by the belief that funding for OSTP was money down the drain.

Asked about a National Academy of Sciences report calling for new methods of determining R&D priorities (see In Print, P. 8), Graham replied that "the report reflects a lack of understanding" of how the Reagan Administration had dealt with the matter.

Graham's denunciation of scientific "tsardom" followed his expressions of praise for "intellectual freedom, the pluralism of the system" as keystones of scientific creativity.

He did not identify the backers of a tsar, nor are they known in or around science-policy circles.

Regarding the SSC, for which the budget lists $150 million for "preconstruction R&D," Graham said, "One-third of the cost of this project will be supported by international partners and other non-federal sources of funding."

The "other" apparently is Texas, winner of the SSC site competition, which has assembled a $1 billion kitty for the project. International partners, however, have so far been elusive, a matter of concern to the White House, since influential Congressmen are insisting that the US not go it alone financially on the $4.4-billion venture. Asked after the briefing to identify the international partners, Graham replied that "informal discussions have been encouraging," but he did not provide any details.

Industrial R&D

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technological affairs, it is the greatest powerhouse, disposing of over $40 billion a year and casting its influence throughout the scientific and technological enterprise.

The Pentagon's best-known recent innovation in sci-tech organization is Sematech, an industrial consortium for research on semiconductor- manufacturing techniques for which DOD provides $100 million a year. The Pentagon just recently announced plans to provide $30 million for American industry to maintain a presence in research on high-definition television (HDTV). Widely regarded as an assured boom industry of the 1990s, HDTV, offering a remarkably clear and brilliant picture, has been under intensive research in Japan for over a decade, and Western Europe is working hard on it, too. But to the dismay of the Pentagon, which relies on TV for battlefield surveillance, American industry became discouraged by the distant prospects of profits, and abandoned the field.

So, again to the rescue comes the Pentagon, justifying its growing economic role on the indisputable link between industrial capability and national security. Moreover, as Defense officials point out, the military and high-tech industry are old partners. What they fail to address is that in the old days, the armed services focused on nourishing new technologies that could be adapted to military purposes. In its new role, the Pentagon is throwing lifelines to America civilian industry that can't make it in international competition.

There has been some but not much public discussion of the implications of DOD's expanding role in the high-tech economy. The most critical assessment was offered last September by Robert M. White, President of the National Academy of Engineering (SGR, October 15), in one of the most important research-policy speeches of the year.

In the absence of a national technology policy or a federal agency responsible for fostering technology, White stated, "The Department of Defense has become the nation's de facto Ministry of Technology and Industry by default. While we need to be thankful that some agency is taking the initiative," White said, "the Defense Department is not where it should be. I find it interesting, that the recent budget proposals of the Japanese Ministry of International Trade and Industry targeted such fields as artificial intelligence, superconductivity, and hypersonic planes among others for concerted attention. And where are the analogous initiatives in the US government?" White asked. "Largely

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Academy to Make New Export-Control Study

Under a request written into the trade bill by the last Congress, the National Academy of Sciences is preparing to produce an encore to the big and influential case for relaxed export controls that it dropped on the Reagan hardliners two years ago.

With warm trade winds now blowing between east and west, the forthcoming study is not threatened by the behind-the-scenes hostility and sabotage encountered by its predecessor. However, since no one is arguing for elimination of all restrictions on high-tech deals with the Soviets, the new Academy study has the potential for staking out the forbidden territory in trade.

The earlier study, *Balancing the National Interest: US National Security Export Controls and Global Economic Competition*, tilted Congressional sentiment in favor of loosening up on high-tech trade restrictions, and heartened the trade advocates in the listless Commerce Department. Anticipating the thrust and effect of the first study, the Pentagon unscrupulously withheld promised data and refused to pay half of the $200,000 that it had originally pledged for the study (SGR, October 15, 1986, "NAS Stiffed for $100,000").

The perpetrators of that scheme, Assistant Secretary for International Security Policy Richard N. Perle and his sidekick, Stephen Bryen, are gone from the Pentagon, and no ideological kin have been appointed to their places. The Defense Department finally paid the $100,000 it owed the Academy after Rep. Les AuCoin (D-Ore.) earmarked the money in a Defense appropriations bill.

The new study, scheduled for delivery in 18 months, will be directed by Mitchell Wallerstein, the NAS staff member who directed the earlier effort. It will focus on the feasibility of controlling sensitive technologies that are increasingly available on world markets. It will also examine the role of CoCom, the highly porous US and Western Europe plus Japan coordinating committee for controlling strategic exports.

The trade bill authorizes $900,000 for the study, with the funds to come from the Pentagon and the Department of Commerce. Still to be selected by the NAS is the panel of specialists that will conduct the study and produce the report.

Science Adviser's Aide Says "Stealth" Tag Inaccurate for Boss

A spokeswoman for White House Science Adviser William R. Graham has protested an article in the *San Francisco Chronicle* that called her boss the "Stealth science adviser." The article stated that, like the plane that doesn't return radar signals, "Graham doesn't return phone calls."

That description of Graham was actually first expressed by SGR of October 1, 1988, without evoking a response from the generally furtive Graham enterprise. But silence was broken when the Stealth image was innocently misattributed October 17 in an article in the *Chronicle* by Charles Petit, a science reporter.

Petit, reviewing science-policy affairs in the Reagan Administration, stated that "Graham has little standing contact with other scientists and apparently has an equally low profile at the White House." The article then went on to quote Robert L. Park, the energetic and well-informed Washington representative of the American Physical Society (APS), as saying: "We call him the Stealth science adviser. A Stealth bomber doesn't return radar signals, and Graham doesn't return phone calls. He is just pretty much invisible."

Petit also wrote that "both [Presidential] campaigns have listened to a parade of scientists pleading for a science adviser with real stature."

In a letter dated November 9, Graham's Director of Public Affairs, Mary Catherine English, protested to Park's boss, William W. Havens Jr., APS Executive Director. Accusing Park of an "absolutely unwarranted denigration of the President's Science Adviser," English wrote, "If Dr. Park has ever telephoned Dr. Graham, we find no record of such a call." She added that "Dr. Graham is in touch with many scientists across the country....As a White House adviser, Dr. Graham does not strive for a high profile in the media, but he is certainly accessible to the media...."

English concluded her letter by asking whether Park speaks for the APS, and went on: "If Dr. Park does not speak for the APS, can we hope that he will state that his opinions are his, and his alone?"

Park's response, in a letter to English two weeks later, said in part: "I am afraid I cannot claim authorship in this case.

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Industrial R&D

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in the DOD."

White then sounded a theme that will be heard many times over in Congressional hearings and debates this year: "We have a science policy but no technology policy. And while the debates in this city center largely on priorities for scientific activities, these debates, however important, are only loosely coupled to the fundamental issues that our country faces. As a new period of opportunity is presented with the election of a new President," he concluded, "we must come to grips with the need for a new technology policy."

The early stages of important political moods are more easily sensed than pinned down or calibrated. Mood sensing in Washington suggests a feeling that basic science has been well taken care of, even if its practitioners can cite numerous needs. The task ahead for politics is to extract greater economic utility from the country's enormous spending on research and development. DSG

NIH Asks Dingell for Help in Baltimore Inquiry

The National Institutes of Health's long and bumbling investigation of the so-called Baltimore case took a new turn last month when the Director of NIH requested assistance from Rep. John Dingell (D-Mich.), who has charged NIH with mishandling the inquiry. Dingell chairs the Energy and Commerce Committee, which writes the basic legislation for NIH.

The irony of the request from NIH Director James B. Wyngaarden is that Dingell's information on the case comes from two ostracized NIH scientists, Ned Feder and Walter Stewart. Originally starting out as moonlighting investigators of scientific misconduct, they have since been officially "borrowed" by Dingell to assist his investigation of charges that NIH is soft on scientific misconduct (SGR, Nov. 15, Dec. 1, 1988). Last year, before being detailed to assist Dingell, the pair offered to help NIH's own investigation, but were turned down by NIH officials.

The case arises from allegations of a coverup of errors in a paper in the April 25, 1986, journal *Cell* co-authored by Nobelist David Baltimore, Director of the Whitehead Institute for Biomedical Research, at MIT.

A former postdoctoral fellow associated with the research, Margot O'Toole, charged that statements in the paper, concerning gene expressions in transgenic mice, were at variance with the actual research data. In retaliation, she told a hearing held by Dingell last year, her scientific career was blighted. NIH had initially asked two colleagues of Baltimore to investigate O'Toole's charges, but dropped that plan when Dingell expressed outrage. NIH subsequently appointed a three-member investigating panel screened for conflict of interest.

Several of O'Toole's major allegations were upheld in a draft report produced in November by the panel. It reported that it found "no evidence of fraud, conscious misrepresentation, or manipulation of data," but it faulted the authors of the *Cell* paper for "serious errors of misstatement and omission, as well as lapses in scientific judgment and interlaboratory communication."

O'Toole, however, felt that the panel's draft report was too kind to the authors, and that the investigation was superficial. In response to NIH's request for comments on the draft, she noted that "the panel ignored evidence discovered by Mr. Stewart and Dr. Feder," refusing even to talk to them.

NIH has apparently had second thoughts about the risks of ignoring whatever evidence Feder and Stewart may possess in the case. A letter to Dingell last month, (signed by NIH Deputy Director William F. Raub for Director Wyngaarden) states that in reviewing the investigation, NIH had concluded that "information was incomplete on one issue"---not identified. The letter noted that additional information was being sought, presumably from Baltimore and his colleagues. But if "this information is inconclusive," the NIH letter stated, "we may need to examine the original data" which Stewart and Feder obtained from a colleague of Baltimore under whom O'Toole worked, Thereza Imanishi-Kari.

The Raub-Wyngaarden letter added that "we would appreciate your advising us of any information obtained in your concurrent investigation of this matter that is inconsistent with the confidential draft report of the panel of scientists...."

The information now sought by NIH was available for nearly a year from its own staff members, Stewart and Feder, but was deliberately ignored. Now that they are assisting a Congressman who figures large in NIH affairs, NIH has developed a keen interest in knowing what they know.---DSG

"Stealth"

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The 'stealth' quote is the intellectual property of Dan Greenberg, Editor of *Science & Government Report*....I am quite sure that if I quoted Mr. Greenberg, I gave him full credit."

Addressing the question of whether he speaks for the APS, Park stated that "the positions I take remain within the bounds of guidance I receive from the elected officers of the APS....The American Physical Society attaches great importance to the position of Science Adviser to the President. I am sure that you are aware that the APS, together with many other groups, has called for strengthening the White House science-advisory apparatus."

Big Hole in NIH Staff Study

The Institute of Medicine's recent report on staffing problems at the National Institutes of Health was supposed to explain and prescribe for the hemorrhage of talent from what has long been the world's leading biomedical-research establishment. But an important question was left unexamined by the 14-member committee of researchers and administrators, chaired by President Harold Shapiro of Princeton University, that produced the report:

The question: What is the source of the wealth that enables academic institutions to pay superior salaries to lure away outstanding NIH staff members? Answer: Much of it actually comes from NIH, which imposes virtually no restrictions on the portion of its research grants that may be used to pay the salaries of its grant recipients.

And what proportion of NIH's overall extramural research-project funding of $4 billion this year is actually channeled into the salaries of principal investigators and associated staff? According to data supplied to SGR by NIH, the figure stands at about 68 percent, not much changed from recent years. NIH, in effect, is a major source of finance for

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...Unlike NIH, NSF Limits Grant Use for Salary

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the salaries paid by the institutions that have been hiring away some of NIH's most distinguished researchers.

Apart from a policy of reviewing grant applications for "reasonableness" on financial matters, NIH has no rule limiting the amount that can go into the salaries of grantees. This is in contrast to the National Science Foundation, for whose grantees Congress last year set a cap of $95,000 as the maximum institutional salary toward which proportional contributions may be made from NSF grant funds.

These matters are not mentioned in the IOM report, *A Healthy NIH Intramural Program* (159 pp., no charge, limited number of single copies available from: the Institute of Medicine, Office of Communications, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-2352.) At a press briefing on the report, Shapiro was asked whether his panel had examined the irony of NIH financing its own competition. He said it had not.

The study, containing a good deal of previously scattered and unavailable data, notes that the top salaries for senior researchers and administrators on the staff of NIH is between $99,500 and $105,000. For senior physicians, it reports, those figures are about 50 percent of the going rates in medical schools; NIH's senior PhDs were reported at 83 percent of medical school salary rates.

Spurred by the Congressional cap on NSF, NIH has become concerned about its apparently unwitting role in salary inflation, and it has begun studies to determine just how high its grantees are going in deriving their pay from NIH grants. NIH tells SGR that, beyond that overall figure of 68 percent of grant funds going into salaries, it knows little more about what's going on.

Asked whether a grantee could take $150,000 a year in salary from an NIH grant, an NIH official said, "There's no cap." He added that NIH is now sampling three percent "of all grant mechanisms" to determine the uses of its money.- It should be noted that even if NIH funds are not directly devoted to a superstar salary, NIH is nonetheless the main tributary for the river of money that supports biomedical research.

This is especially the case for medical schools, which proclaim themselves impecunious, while using NIH money to hire away NIH staff at rates forbidden to NIH. Somehow, the IOM study overlooked this item.---DSG

To the Editor: Pentagon Isn't Neglecting Support for Science

SGR (February 15, 1988) quotes NSF Director Erich Bloch claiming that the Pentagon is "getting a free ride in its use of basic research"; also, that while DOD's budget for R&D has risen, the percentage devoted to basic research is "a smaller share than 10 years ago."

DOD's needs for basic research far exceed the available resources, but we do support a substantial basic research program, one that is larger in real dollars by more than 20 percent than 10 years ago. The DOD basic research program is close to $1 billion, not insignificant compared to that of NSF [$1.6 billion]. These DOD dollars support basic research which is important to DOD needs. We are certainly not "getting a free ride." DOD support for basic research is greater now than it was 10 years ago, counter to the impression left by Mr. Bloch.

Another SGR report (November 1, 1988), quoting Mr. Bloch and Dr. Mary L. Good, Chairman of the National Science Board, leaves the erroneous impression that DOD basic research has recently become much more mission oriented, short term, and applied. From my experience at the Office of Naval Research (ONR), 1974-84, and nearly five years at the Air Force Office of Scientific Research (AFOSR), I believe that claim is unfounded. Mr. Bloch and Dr. Good, in fact, stated [at a press briefing] that they are not familiar with the DOD basic research programs in detail, and I claim that you cannot tell a book by its cover.

Fully 60 percent of AFOSR funds support basic research at universities---up from 55 percent four years ago. Contrary to their opinion, our support for basic research has not "evaporated."

Contrary to the statements in these articles, DOD basic research is alive and well within the budget limitations that we all must live with. ONR has supported excellent basic research for over 40 years and AFOSR for over 35.

Our mission remains the same: to increase knowledge and understanding in science and engineering related to long-term national security needs. We believe that we have been very successful at this and request only the opportunity of equal time.

John O. Dimmock
Technical Director
AF Office of Scientific Research
Bolling Air Force Base
Washington, DC

[Editor's note: Despite that billion a year spent by the Pentagon, the perception persists that, relative to its use of science, the Department of Defense is a parasite on the national scientific enterprise. For example, *Electronic Engineering Times* of October 24, 1988, under a headline "Basic R&D in defense suffers setback," states: "Basic research was one Pentagon activity that missed out on much of the largesse from the Reagan defense buildup.

"The defense share of the total federal basic research investment has been slowly decreasing since 1965 and failed to rally even during the first half of this decade, an Air Force Association report said."]

...In Print: R&D Priorities, Japanese Literature

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Reaganite diehards in national security affairs: The world is awash with computer hardware and software, attempts at restrictions on exports to the Soviets are increasingly futile, and export controls should be confined to high-performance systems. The report, prepared by a committee chaired by Seymour E. Goodman, University of Arizona, also urges the US government to "greatly increase its investment in the monitoring of computer technology development and associated market trends around the world."

Order from: NAS, Computer Science and Technology Board, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-2605.

Federal Science and Technology Budget Priorities: New Perspectives and Procedures (23 pp., no charge), by the heads of the National Academy of Sciences and its affiliates, prepared in response to a Congressional request originating in the Senate Budget Committee, proposes adoption of a big-picture approach to federal R&D activities. The report, reflecting views expressed last year by NAS President Frank Press (SGR, May 1), says the current agency-by-agency promotion of R&D should be complemented by "cross-cutting" strategies. These would be focused on the science and technology "base" of training and facilities, pursuit of economic, military, and social objectives, and major initiatives, such as the space station and the Superconducting Super Collider. It's all very sensible---as well as politically naive. Most useful is a suggestion for an expert review of the Pentagon's casual use of "research and development" to cover some $40 billion worth of highly disparate activities.

Order from: NAS, Office of Government and External Affairs, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-1601.

Towards a Science Policy for the 1990s (ISBN 90 346 1660 6; 30 pp., $10), a working paper (available in English) from the Netherlands Ministry of Education and Science, examining policy options for science, technology, the humanities, and related educational activities. The framework is Europe's movement toward economic amalgamation in 1992, the traditional internationalism of Dutch R&D, and the future role of national agencies. The working paper, aimed at eventually supplanting a 1974 Science Policy Document, is a bit windy and non-specific.

Order from: Distribution Office, PO Box 20014, 2500 EA, The Hague, the Netherlands; tel. 31/70789885.

Japanese Science and Technology: A Directory of Resources in the United States, revised and expanded second edition (PB 88-211073/BBP; 165 pp., $36 plus $3 handling), by the US National Technical Information Service, lists hundreds of private, academic, and government services that collect and disseminate Japanese technical information, plus libraries with extensive Japanese holdings, etc.

Order from: NTIS, Springfield, Va. 22161; tel. 703/487-4650.

Framework for Institutional Policies and Procedures to Deal with Fraud in Research (10 pp., no charge), yet another set of guidelines for dealing with what the mandarins insisted was a non-existent problem, until Congress rubbed their noses in it. This one comes from the Association of American Universities, the National Association of State Universities and Land Grant Colleges, and the Council of Graduate Schools. Fearing the rough hand of the feds, it concentrates on institutional responsibilities and strikes a sound balance among rooting out fakers, protection of complainants, and rights of the accused.

Order from: Association of American Universities, Director of Public Affairs, One DuPont Circle NW, Washington, DC 20036; tel. 202/466-5030.

Corrections

The speech by Robert Rosenzweig quoted in SGR of December 15, 1988, was delivered to the annual meeting of the Council of Graduate Schools, not to the Association of American Universities, of which he is President.

The National Science Board listed the right panel but the wrong members in providing SGR a copy of a report, "A Responsible Scientific Community," quoted here December 15. The report was produced by the NSB Committee on Openness of Scientific Communication, of which, we are now advised, the members are:

Chairman Frank H.T. Rhodes, James J. Duderstadt, Charles E. Hess, Charles L. Hosler, Kenneth L. Nordtvedt Jr., James L. Powell.

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Toll-Free Subscription Service: 1-800-522-1970; In Wash., D.C.: 785-5054

In Print: R&D Funding, Physics News, Education

The publications listed are obtainable as indicated---not from SGR.

Research and Development Funding: FY 1989 (16 pp., no charge). After the end-of-the-session smoke clears from Capitol Hill, it takes time to sort out the money bills and calculate appropriations. Here it is for R&D, a final tally of funds appropriated by the last Congress for the current fiscal year (which ends next September 30), produced by the Science Policy Research Division of the Congressional Research Service (part of the Library of Congress). Among the highlights: With government-wide R&D appropriations totaling over $60 billion, Defense R&D, at $38 billion, remained unchanged for the third straight year, while non-defense research experienced some rare growth. The report notes that for the first time in nearly a decade, civilian research at the Department of Energy will grow faster than DOE's military programs, which rose by 65 percent in constant dollars between 1980-89, while civilian programs dropped by 50 percent.

Order from: Library of Congress, Congressional Research Service, LM 213, Washington, DC 20540; tel. 202/707-7132.

Physics News in 1988 (67 pp., $5; lower for multiple copies), from the American Institute of Physics, 20th of an annual series, in slick magazine format, summarizes developments in over a dozen fields of research and in education, plus the latest Nobel awards.

Order from: Public Information Division, American Institute of Physics, 335 E. 45th St., New York, NY 10017; tel. 212/661-9404.

Elementary and Secondary Education for Science and Engineering (GPO Stock No. 052-003-01141-7; 146 pp., $7), report from the Congressional Office of Technology Assessment, says schooling is important but so are many other factors in encouraging students toward careers in science and engineering. The federal role, it says, should be focused on "aspects of the [kindergarten through 12th grade] education system that have fallen through the cracks" in state and federal programs. Cited as past examples of that role are the 1960s "Great Society" programs for poor and disadvantaged children and legislation providing science equipment and teacher training. For today's problems, however, OTA tends toward the vaporous: "The ongoing challenge for NSF in science and engineering education will be locating particular niches where it can make a useful and detectable difference, rather than being an agent of change on a broad scale."

Another OTA report addressing the same subject area was issued in June: ***Educating Scientists and Engineers: Grade School to Grad School*** (GPO Stock No. 052-003-01110-7; 128 pp., $6).

Order from: Superintendent of Documents, USGPO, Washington, DC 20402; tel. 202/783-3238.

Chemical Risk Communication: Preparing for Community Interest in Chemical Release Data (28 pp., no charge), handbook, from the American Chemical Society, offering advice on how to answer the public and press inquiries bound to arise from 1986 Superfund Amendments requiring chemical facilities to report routine releases into the environment of more than 300 chemicals. Intended mainly for industry and public-health officials, the handbook spells out the reporting requirements, extols "honesty and sincerity," and advises those on the griddle that they should "not expect to be trusted." The Alfred P. Sloan Foundation helped pay for preparation of the handbook.

Order from: ACS, Department of Government Relations and Science Policy, 1155 16th St. NW, Washington, DC 20036; tel. 202/872-4395.

Global Trends in Computer Technology and Their Impact on Export Control (288 pp., $10), a report from the National Academy of Sciences, commissioned by the State Department, has some bitter tidings for the few remaining

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